MOUND

Environmental Restoration Program

The MOUND Tritium D&D Large-Scale Demonstration and Deployment Project

Burndy Lightweight Portable Crimper for Tubing and Pipe

THE NEED

During fiscal year 1999, the U.S. Department of Energy Miamisburg Environmental Management Project (DOE-MEMP) Office and BWXT of Ohio, Inc. conducted a demonstration using a portable, lightweight crimping tool which provides gastight, or near gastight, seals in tritium contaminated stainless steel and copper tubing up to 1 inch in diameter. The tritium processing facilities at Mound encompass miles of tubing, both single and double wall, used to transport tritiated gases. The Mound Exit Project requires that processing area lines be dismantled and packaged for offsite burial. Baseline approaches involve the use of saws, tube or bolt cutters, torches, and in some cases, secondary containment devices to capture any releases of tritium. Containment devices and/or the use of air supplied suits for workers are especially costly and have negative effects on productivity. The objective of this demonstration is to provide a tool that ensures a leaktight seal to eliminate the need for additional containment devices or protective equipment.

THE TECHNOLOGY

The innovative technology demonstrated in the Mound LSDDP is an AC powered hydraulically assisted crimping tool. The crimper head weighs less than 8 lbs. and connects to the end of a 25 ft. hose. The cart-mounted pump enables the entire unit to easily move between job sites and provides sufficient hose to reach tubing in high bay areas. The unit delivers 12 tons of force and 10,000 psi to the crimping die. The standard die was modified for use on this project by installing two parallel dowels in the die, set at a right angle to the tube selected for crimping. This modification directs the crimping force to the dowels and provides the tight seal that is crucial for this application. A battery powered unit with a shorted hose is also available, in addition to a manual crimper that typically requires 35-50 strokes to reach the 10,000 psi pop-off pressure. The AC unit was selected as the model of choice for this demonstration.

THE DEMONSTRATION

This demonstration was completed in two phases. In Phase One, a station was constructed to permit various sizes of stainless steel and copper tubing, both single and double walled, to be tested. The manifold for the system was connected to a vacuum pump and gauge to obtain pressure measurements. After crimping and cutting a specific piece of tubing, the rise rate of pressure was measured, recorded, and an indication of the leaktightness of the crimped area was obtained. The test engineer used this phase to evaluate the performance of the crimper and die, and to enhance the crimping technique. In Phase Two of the demonstration, the crimper was used to remove several sections of tritium contaminated tubing.

RESULTS

The results of Phase One were used to redesign the crimper die. A deflection of the crimper jaws was noted at the open side of the crimper. In response, the dowels were offset by .015 inch at the end of the die to compensate for the deflection. The result was a more uniform seal across the crimped surface of the tube. Phase One also demonstrated the importance of positioning the tube at the center of the die and having the tool at right angles to the tube. In Phase Two, over 300 ft. of contaminated tubing was removed ranging in size from 3/8 to 3/4 inches in diameter, including some double walled tube. The crimped surface was cut with bolt cutters and no release of tritium was noted. The process was improved by crimping at two-ft. intervals and cutting every 10 ft. Upon completion, the tubing was folded over at the crimps to produce a configuration that fit into waste containers.

BWXT of Ohio, Inc.

NETL NATIONAL ENERGY TECHNOLOGY LABORATORY

University of California
Lawrence Livermore National Laboratory

CONTACTS

James O. Johnson, DOE-MEMP Technical Program Officer, (937) 847-5234
Harold Shoemaker, Project Manager, National Energy Technology Laboratory, (304) 285-4715
Donald Krause, Tritium LSDDP Project Manager, BWXT Services, (937) 865-4501
Brian Berardi, Sales Representative, Burndy Products, (800) 678-6681, ext. 3042

Burndy Y35BH Remote Power Operated Pipe Crimper

An innovative tool for capillary tubing removal from Burndy Electric, a division of Framatome Connectors, USA

The purpose of this crimping tool is to perform safe, efficient isolation of capillary tubes and provide a flat cutting surface for cutting with hand-held shears.

BENEFITS

- Creates a leak-tight crimp
- Gas emissions are greatly reduced and possibly eliminated
- Reduces worker exposure
- Increases productivity when cutting

EQUIPMENT

- The Y35BH HYPRESS™ hand-held crimping head weighs only 8 pounds, is 9 inches in height, 5 inches in width, and crimps up to 1 inch pipe diameter
- Maintains an output force of 12 tons at an operating pressure of 10,000 psi
- Employees an open C style head to facilitate placement on the tube, even in a cramped environment
- Provides for remote operation of the crimper with a pendant switch
- Uses a separate compact hydraulic pump with a high-pressure hose and quick disconnect fittings

BASELINE TECHNOLOGY

- Tube cutters, hydraulic shears, grinding tools, electric reciprocating saws
- Grinding and saw mechanisms generate secondary waste
- No mechanism exists for preventing radioactive emissions from escaping inside the tube - must be performed with pipe under negative pressure